

Section 6-4: e and Natural Logarithms

Let's begin with **The Number e** on page 389. Pair up with a partner to work through this, recording your answers below.

1.a. You can do the work in your calculator.

$$n = 1$$

$$n = 2$$

$$n = 4$$

$$n = 6$$

$$n = 12$$

$$n = 24$$

$$n = 36$$

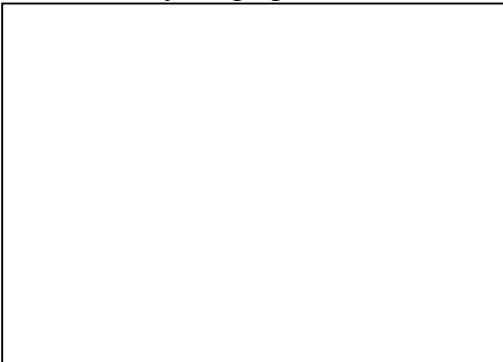
$$n = 365$$

b. What is your conclusion?

c. Try a new value for n . What did you find?

2. $e =$

3. a. Sketch your graph in the box below.



b. What is true?

c. Which n did you try? Are the graphs the same?

d. What do you think? Why or why not?

e :

Example 1: If \$10,000 is put into bonds that pay 7.35% interest compounded continuously, find:

- a. The annual yield
- b. The value of the investment after one year

Continuous Change Model:

Example 2: Suppose \$10,000 is put into a 5-year certificate of deposit that pays 7.35% interest compounded continuously.

- a. What is the balance at the end of the period?
- b. How does this compare with the balance if the interest were compounded annually?

The Exponential Function with Base e :

Natural Logarithm:

Example 3: Consider the region bounded by the graphs of $y = \frac{1}{x}$, the x -axis, the line $x = a$, the line $x = b$, where $x > 0$. Using calculus, it can be proven that the area of that region is $\ln b - \ln a$. What then is the area bounded by the graph of $y = \frac{1}{x}$, the x -axis, the line $x = 1$, the line $x = 7$, where $x > 0$?

Homework:

"Nothing in life is to be feared, it is only to be understood. Now is the time to understand more, so that we may fear less." - Marie Curie